

» Application Story «

Box PC in Medical



Six eyes see more

System solution for 360° 2D barcode identification on cylindrical objects



Seidenader has developed the SV360 Vision Inspection Module for the interruption-free identification of 2D barcodes on medicine bottles. It finds, reads and inspects the 2D codes by capturing 360° images of the bottles while they are travelling through the module. The compact, robust and long-term available embedded computer technology at the heart of this module was custom-designed by Kontron.

In order to protect consumers from fake or wrongly labeled medicines, the American Food and Drug Administration (FDA) and the European Commission have imposed regulations for the complete monitoring of manufacturing and delivery chains of medicines. To ensure compliance with these legal requirements, each medicine's packaging has to have a distinctive identification label which can, for example, be made up out of the medicine's unique code numbers, the expiry date and the batch number. Barcodes are the packaging industry's preferred choice of identification, as these can be machine-read with great precision and the data can be electronically processed. 2D barcodes are becoming more and more popular in the industry as they, in comparison to the barcodes in food packaging, have a much higher information density per unit of area. (See picture no.1).



Image 1: In comparison to the classical barcode (bottom left-hand) the information density of the 2D barcode is much higher.

The packaging industry faces new challenges

In comparison to one dimensional barcodes, the 2D barcodes, which are made up of layers of barcodes, cannot simply be read by a laser scanner. Capturing 2D barcodes requires high resolution optical reading devices such as CCD scanners or cameras to reliably identify the pixel pattern of the codes which often measure no more than 9 x 9 mm. Another difficulty is the fact that the pharmaceutical packaging units which have to be read are more often than not cylindrical plastic bottles. This physical form presents the packaging industry with a further challenge: the horizontal position of the individual bottles (and consequently the position of the barcode which has to be identified) on the conveyor belt is another variable. It is, on the one hand, possible to mechanically place the bottles in the right position in front of the reading device by, for example integrating an additional module to turn the bottles. On the other hand however, apart from this meaning a further intervention in the packaging line, it also can slow down the throughput rate.

The new inspection module never misses a thing

The German company Seidenader Vision GmbH, a leading manufacturer of optical inspection systems for the

pharmaceutical industry, has developed a solution which overcomes this problem efficiently. The SV360 Vision Inspection Module examines cylindrical objects such as plastic bottles or small glass vials by generating a 360° view of the bottle on the conveyor belt. This panoramic view eliminates the need to carry out time-consuming positioning of the bottle on the conveyor belt. The inspection module, which has a throughput rate of up to 400 containers a minute, can be flexibly integrated at any place on the conveyor belt. Banding stations or cartoning machines are typical examples of the areas of application. The Vision Inspection Module has six cameras with integrated LED flashes which are positioned at an angular distance of 60°. When the bottle passes the inspection module, automatically, six individual photos of the bottle are taken and used for localizing and identifying the 2D barcode. SVOobserver, the integrated imaging software, analyzes either each of the overlapping photos or compiles the six pictures to one single photo. With the help of a pattern recognition process the barcode is first detected on the compiled photo material and then decoded via software. Following on from this, the identification figures are verified by code matching and documented in a database for the next aggregation level.

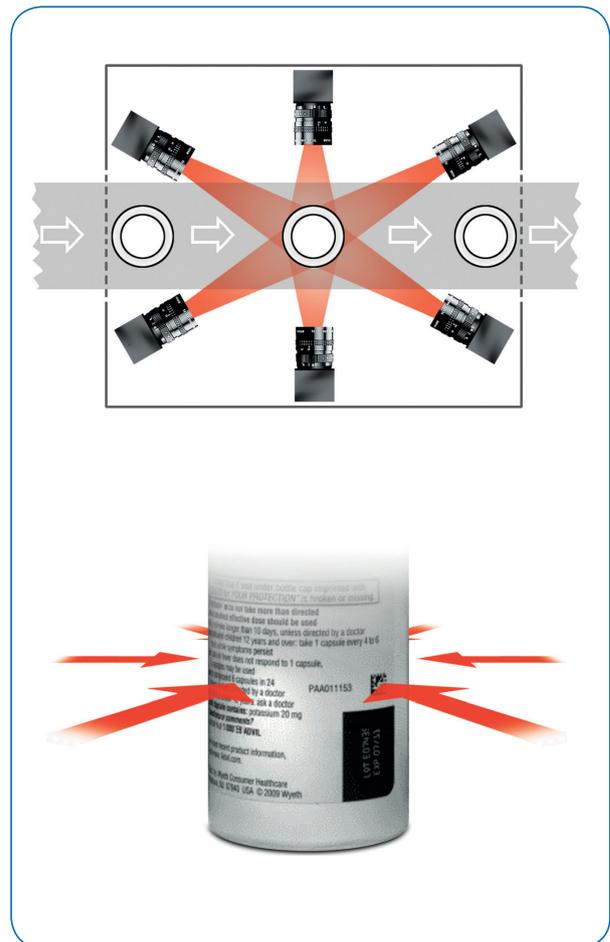


Image 2: The SV360 Vision Inspection Module carries out interruption-free inspection of the bottles travelling on the conveyor belt by generating a panoramic 360° view of each single bottle. The photographic data is then transferred to an industrial PC which identifies, verifies and documents the barcode data.

Tough requirements on the hardware

To ensure that this high performance system provides long-term and interruption-free service, Seidenader required a high performance hardware platform to fulfill its tough demands: "When we set out to look for the right industrial PC, apart from the most important quality factors like high performance, long-term availability, reliability and robustness the individuality of the system design was a main priority", Andreas Böhme, Manager Vision Engineering at Seidenader, explains. "On top of being able to connect six cameras via Firewire the Box PC also had to have a microcontroller module for flash control and I/Os on the housing's front panel. With this high level of individualization in mind, we decided on a custom design from Kontron who didn't just convince us by the way every single one of our individual design needs was easily implemented. A further decisive factor was Kontron's established position in the market which was key to us in order to ensure the long-term design security we need."

Customized hardware design by Kontron

Kontron supplied Seidenader with the individually designed and application-ready industrial Box PC SVIM X2. Apart from the high performance and five year long-term available Kontron Flex ATX motherboard 986LCD-M/Flex, the Box PC (170 x 300 x 272 cm) also integrates a customer-specific extension board. Kontron has developed this carrier board especially to accommodate the RCM3220 microcontroller module from Rabbitcore. The required number of digital I/Os with the corresponding characteristics was integrated directly on the front panel. Also the requested Firewire interfaces were implemented on the front panel of the custom-designed chassis. Via the camera connections (a maximum of four is possible) and with specially selected 8 pole connectors the cameras are fed asynchronously with strobe and trigger signals.

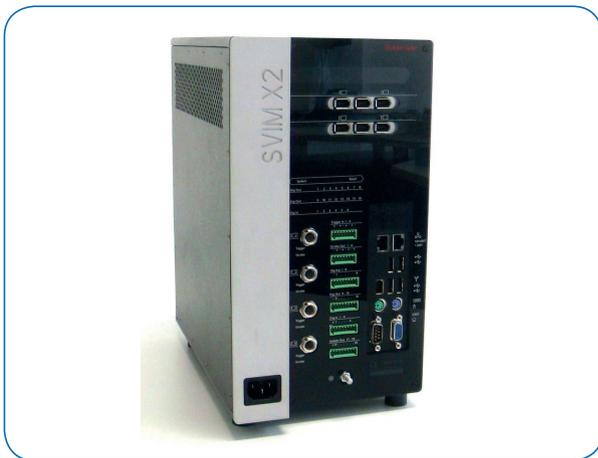


Image 3: Kontron ships the Box PC for the Seidenader SV360 solution tailored to meet Seidenader's individual requirements. It comes with six Firewire connections (currently a maximum of three asynchronous Firewire cameras is planned on the I/O board), various I/Os (trigger, strobe, GPIO) and two storage media in a RAID array.

In addition, two integrated fast SATA hard disks in a RAID 1 array guarantee a high level of data integrity and security via redundant data storage. Further to this, the Box PC provides two fast Gigabit Ethernet interfaces which are used to connect with control computers and databases. The Ethernet connection can be also used to set up the system remotely. To enable this, the SVIM X2 system is visualized on the control computer, so that the Box PC can be controlled in "headless" mode – i. e. without use of a display or input devices.

Selected components for high availability

Along with the application-specific tailoring of the Box PC, Kontron offers Seidenader the necessary overall reliability of the system, as a high level of failure safety plays a major role for Seidenader. To ensure this, all the board components have to fulfill the highest requirements, as even the smallest capacitor can bring a whole system to a halt. An important characteristic to assess the quality of the overall design and which takes every component into consideration is the MTBF (Mean Time Between Failure) of the integrated embedded hardware, which in the case of the Kontron designed and manufactured board, totals 170,000 hours.

Long-term availability protects investments

Long-term availability was a further critical issue for Seidenader. Starting with the date of the original purchase, Kontron guarantees long-term availability of the identical configuration for at least five years, so that even after several years fully compatible hardware is available. This ensures that a one-time investment can be put to long-term use. The longer the hardware is available, the more cost-efficient the whole lifecycle of the SV360 solution becomes.

However, a successor with the power to smooth the transition to the next generation, the KTQ67M/Flex, is waiting in the wings. Seidenader is already planning to apply the board using the second generation of Intel® Core processor technology in future, and thus profit from up to double the performance, without overloading the thermal concept of the compact server.



Doris Winter
Custom Program Manager
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About Kontron

Kontron is a global leader in embedded computing technology. With more than 40% of its employees in research and development, Kontron creates many of the standards that drive the world's embedded computing platforms. Kontron's product longevity, local engineering and support, and value-added services, helps create a sustainable and viable embedded solution for OEMs and system integrators.

Kontron works closely with its customers on their embedded application-ready platforms and custom solutions, enabling them to focus on their core competencies. The result is an accelerated time-to-market, reduced total-cost-of-ownership and an improved overall application with leading-edge, highly-reliable embedded technology.

Kontron is listed on the German TecDAX stock exchanges under the symbol "KBC". For more information, please visit: www.kontron.com

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